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REMARKS

Claims 1-34 are pending. In view of the following remarks, Applicant respectfully requests reconsideration and allowance of the subject application.

The § 101 Rejections

Claim 32 stands rejected under 35 U.S.C. 101 as allegedly being drawn to non-statutory subject matter. The Office argues: "[t]he claim solely teaches the manipulation of abstract data, and is not tangibly embodied." Applicant disagrees and requests reconsideration.

Guidelines for application of 35 U.S.C. §101 are found in MPEP 2106, entitled "Patentable Subject Matter - Computer-Related Inventions". This MPEP section sets guidelines for determination of statutory subject matter.

This MPEP section discusses focusing on whether or not the claimed subject matter accomplishes a practical application. That is, the claimed subject matter must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. Here, claim 32 recites a method producing a "useful, concrete and tangible result" by defining a search pattern, screening received input strings using the search pattern, and implementing a remedial action if the search pattern is found to contain an attack pattern.

As an example of subject matter that embodies the spirit of this claim and produces a "useful, concrete and tangible result", the Office is directed to the Specification starting on page 11, line 4 through page 12, which is reproduced below for the Office's convenience.

Web Server Pattern Matching

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Fig. 3 shows a flow diagram that describes steps in an input string screening method for a Web server in accordance with one embodiment of the invention. Step 200 determines an attack pattern that can be used to attack a Web server. One way in which this determination can be made is by simply observing over time, which attacks on a Web server are successful. Another way to determine an attack pattern is to recognize that there are input string characteristics that can be problematic for a Web server. For example, input strings that contain the pattern "..." can be problematic because they might enable an individual to inappropriately "walk" up a directory tree. Additionally, attack patterns can be determined by recognizing that there are certain characters that are simply not appropriate for inclusion in an input string. Examples of certain operators were given above.

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With one or more attack patterns having been determined, step 202 defines a search pattern that can be used to detect the attack pattern. A search pattern is an expression that is compared with input strings to determine whether there is a matching search pattern in the input string. In the described embodiment, a search pattern can be formatted syntactically in a manner that allows specification of both identity and variability among constituent parts of an input string. Thus, the search pattern can include literal parts that call for an exact character-by-character match between those parts and corresponding parts of the input string, and variable parts that allow for inexact matches or no match at all between those parts and corresponding parts of the input string. An input string is said to "match" a search pattern if the search pattern is found anywhere within the input string as specified by the search pattern. In the described embodiment, one or more search patterns are specified as regular expressions. In a regular expression, each character matches itself, unless it is one of a number of special characters that indicate variable characters in the input string. An example subset of regular expression definitions and their meanings is given below:

Pattern	Meaning
	Matches an arbitrary character
()	Groups a series of pattern elements to a single element
^	Matches the beginning of the target
+	Matches the preceding pattern elements one or more times. For example, ba+c matches bac, baac, but not bc.
\$	Matches the end of the line. For example, 100\$ matches 100 at the end of a line.
[]	Denotes a class of characters to match; [^] negates the class. For example, b[aeiou]d matches bad, bed, bid, bod, and bud (but not bead or beed); and r[eo]+d matches red, rod, reed, rood, reed, roed, reed, etc.
[^]	Matches any character except those following the caret (^) character in the brackets, or any of an ASCII range of characters separated by a hyphen (-).

	For example, x[^0-9] matches xa, xb, xc, and so on, but not x0, x1, x2, and
	so on.
()	Matches one of the alternatives
?	Matches the preceding character zero or one time.
*	Matches the preceding character zero or more times. For example, ba*c matches bc, bac, baac, and so on.
{}	Matches any sequence of characters between the escaped braces. For example, {ju}+fruit matches jufruit, jujufruit, but not ufruit, jfruit, or ujfruit.
\	Removes the pattern match characteristics from the special characters listed above. For example, 100\$ matches 100 at the end of a line, but 100\\$ matches the character string 100\$ anywhere on a line.

In addition, section 2106 of the MPEP states: "Office personnel have the burden to establish a prima facie case that the claimed invention as a whole is directed to solely an abstract idea or to manipulation of abstract ideas or does not produce a useful result. Only when the claim is devoid of any limitation to a practical application in the technological arts should it be rejected under 35 U.S.C. 101. (emphasis added). This section continues by clarifying the Office's burden when such a rejection is made by stating: "Office personnel must expressly state how the language of the claims has been interpreted to support the rejection." (emphasis added).

Here, the Office offers no basis for its argument that this claim "solely teaches to the manipulation of abstract data, and is not tangibly embodied." Specifically, no explanation is proffered to explain how the language of the claim has been interpreted by the Office to lead to its conclusion. Thus, the Office has not met its burden in regards to this rejection. Furthermore, as discussed above, this claim produces a "useful, concrete and tangible result" and is not devoid of any limitation to a practical application.

Accordingly, for the reasons given above, this rejection should be withdrawn.

The § 112 Rejections

Claims 1-17, 22-31, and 33 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for "failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention." In making out this rejection, the Office argues that the phrase "... content that is designed to constitute ..." renders the claims indefinite because it makes it unclear as to whether the content must actually be one of the enumerated types of attack patterns. Applicant respectfully disagrees and traverses the Office's rejections.

In its reasoning, the Office states in its current Action: "content that is 'designed to constitute' something may or may not actually constitute it, depending on the quality of the design. It is therefore uncertain that the limitations subsequently recited would actually be part of the invention, thereby making the claims indefinite." This line of reasoning is misplaced. Whether the design is one that would successfully be able to wage an attack is, for all intents and purposes, irrelevant to the claimed subject matter. Rather, Applicant's disclosure and at least some of its specifically claimed embodiments are directed to methods and systems that can recognize problematic attack patterns (whether or not they would successfully wage an attack), and then do something about them.

The § 102 Rejections

Claims 32 and 34 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,884,033 to Duvall et al (hereinafter, "Duvall").

Claim 32 recites a Web server input string screening method comprising:

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determining an attack pattern that can be used to attack a Web server;

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- defining a search pattern that can be used to detect the attack pattern, the search pattern being specified as a regular expression;
- screening received input strings using the search pattern to ascertain whether the attack pattern is present; and
- implementing a remedial action if the search pattern is found to contain an attack pattern.

In making out the rejection of this claim, the Office argues that Duvall anticipates the claimed subject matter. Specifically, the Office states that Duvall "defines a plurality of unwanted input strings to be filtered (see column 3, line 64 to column 4, line 11), a search pattern that permits variability, can search a portion of the string, and has wildcard characters (see column 6, lines 28-42), receives an input string on a web server (see column 8, lines 18-27), evaluates the strings, and takes remedial action if necessary, including denying the request (see column 6, line 60 to column 7, line 13)."

Applicant submits that Duvall does not anticipate this claim and traverses this rejection. Applicant respectfully reminds the Office that "for anticipation under 35 U.S.C. 102, the reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present." (MPEP § 706.02).

The first element of this claim recites "determining an attack pattern that can be used to attack a Web server. Duvall does not disclose this; and, in fact, the Office does not even cite Duvall for this feature. Furthermore, Duvall does not even remotely suggest determining an attack pattern that can be used to attack a Web server.

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Furthermore, on pages 5-6 of the current Office Action, the Office itself acknowledges that Duvall only discloses filtering objectionable material and does not disclose filtering of attacks on a system. The pertinent excerpt is reproduced below:

Duvall only discloses the use of the invention for the filtering of URL's that are related to material that is objectionable, depending upon the user's tastes and sensitivities (see column 2, lines 12-20). The filtering of attacks on a system, such as a disclosure attack, integrity attack, or a denial of service attack, is not disclosed.

Additionally, Applicant submits that Duvall discloses nothing of search patterns that are useable to search for an attack pattern that can be used to attack a Web server.

Accordingly, as Duvall does not disclose or suggest the subject matter of this claim, this claim is allowable.

Claim 34 recites one or more computer readable media having computerreadable instructions thereon which, when executed by a computer, perform the following steps:

- determining an attack pattern that can be used to attack a Web server;
- defining a search pattern that can be used to detect the attack pattern, the search pattern being specified as a regular expression;
- screening received input strings using the search pattern to ascertain whether the attack pattern is present; and
- implementing a remedial action if the search pattern is found to contain an attack pattern.

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In making out the rejection of this claim, the Office argues that Duvall anticipates the claimed subject matter. As discussed above, Duvall does not even remotely suggest determining an attack pattern that can be used to attack a Web serve, and does not disclose defining a search pattern, as claimed.

Accordingly, as Duvall does not disclose or suggest the subject matter of this claim, this claim is allowable.

The § 103 Rejections

Claims 1-11, 13-30, and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Duvall in view of U.S. Patent No. 6,421,781 to Fox et al (hereinafter, "Fox").

Claims 12 and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Duvall in view of Fox and Oliver et al., "Building a Windows NT 4 Internet Server", 1996, p. 203.

Claim 1 recites a Web server input string screening method comprising:

- determining an attack pattern that can be used to attack a Web server, the attack pattern comprising content that is designed to constitute one or more of a disclosure attack, an integrity attack or a denial of service attack on the Web server:
- defining a search pattern that can be used to detect the attack pattern, the search pattern being defined in a manner that permits variability among its constituent parts;
- receiving an input string that is intended for use by a Web server;
- evaluating the input string using the search pattern to ascertain whether the attack pattern is present; and
- implementing a remedial action if an attack pattern is found that matches the search pattern.

In making out the rejection of this claim, the Office states that "Duvall only discloses filtering of URL's that are related to material that is objectionable, depending upon the user's tastes and sensitivities." The Office further states that "[t]he filtering of attacks on a system, such as a disclosure attack, integrity attack, or a denial of service attack, is not disclosed."

The Office then argues that it would have been obvious "to use the invention of Duvall by checking a URL against domain names, as disclosed by Fox, in order to protect against abusive denial-of-service attacks."

Applicant respectfully disagrees and submits that there would have been no motivation to modify Duvall with Fox. The references themselves provide no such motivation. Additionally, the Office has failed to present a convincing line of reasoning (as required by 35 U.S.C. § 132 (see also MPEP 706.02(j))), that is stated with particularity and which explains why it would have been obvious to incorporate the teachings of Duvall and Fox. To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. See, e.g. Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Here, the Office's stated motivation "in order to protect against abusive denial-of-service attacks" is misplaced because it merely recites the disclosure of Fox and does not explain why a skilled artisan concerned with the invention of Duvall would have been motivated to protect against attacks on a system.

Applicant submits that an artisan concerned with the invention of Duvall would not have been motivated to implement the teachings of Fox because Fox

Specifically, Duvall is concerned with filtering material (including identifying patterns in substrings or embedded in a string) that is personally objectionable, and is not concerned with attacks against a server. Fox, in contrast, is concerned with performing a literal string comparisons to limit abuse by malicious attacks.

Furthermore, so far as Fox discloses performing literal string comparisons,

provides functionality completely different from the intended purpose of Duvall.

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it teaches away from Duvall's method of identifying patterns found in substrings or embedded in a string. In fact, performing literal string comparisons, as taught by Fox, would change the principle of operation of Duvall because a potentially objectionable term, as Duvall filters out, might merely be a part of a phrase containing otherwise unobjectionable terms. (see Duvall, column 6, lines 30-32). In Duvall, it is unlikely that such terms would be identified if literal string comparisons were used because Duvall's filtering system compares portions of messages, and uses wildcard characters, not literal string comparisons, to accomplish filtering. (see Duvall, column 6, lines 34-37). In fact, performing Fox's literal string comparisons in Duvall would effectively render Duvall unsatisfactory for its intended purpose of filtering portions of incoming and/or outgoing messages. Accordingly, an artisan would have no motivation to combine the teaching of such discordant references.

In responding to Applicant's previous assertion that no motivation exists to combine these references, the Office states: "Duvall discloses all of the limitations of the claimed invention, save for the use of the invention for screening URL's for particular kinds of attacks." The Office then states: "Fox discloses such an application and the motivation is sufficient to suggest to one skilled in the art to attempt to use Duvall's mechanism for detecting denial-of-service attacks."

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Applicant vigorously submits that the Office's response begs the question and does not explain why a skilled artisan concerned with the invention of Duvall would have been motivated to protect against attacks on a system.

Additionally, and as an aside, the Office has provided a paper, available at the following link:

http://www.uspto.gov/web/menu/busmethp/busmeth103rej.htm

that describes proper and improper rejections made under §103(a). Particularly instructive is a portion that appears in Section IV of the paper which provides guidance in regards to communicating a proper §103(a) rejection. The pertinent part of this paper is reproduced below for the Office's convenience:

IV. Communicating the Rationale for a Proper Rejection under 35 U.S.C. 103

When an examiner rejects a claim as failing to meet one or more of the statutory requirements for patentability, administrative due process and 35 U. S.C. 132 require that applicant be adequately notified of the reasons for the rejection of the claim so that applicant can decide how to proceed. The statutory requirement that an Office action state the reasons for any rejection is critical to proper action taking.

In writing a rejection under 35 U.S.C. 103, the examiner should appropriately communicate:

- (1) the particular part of a reference being relied upon should be designated as nearly as practicable; 37 CFR § 1.104(c)(2);
- (2) the differences between the claimed invention and the closest prior art;
- (3) where the differences are found or suggested in the prior art;
- (4) how the teachings of the prior art are combined; and
- (5) why the combination of those teachings would have been obvious to one of ordinary skill in the art at the time the invention was made. Do not recite the disclosure of the prior art which reads on the claimed invention as the motivation. Communicate why the references themselves, the knowledge of one of ordinary skill in the art, or the nature of the problem to be solved establishes a motivation to combine the prior art references.

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Once applicant has presented rebuttal evidence, examiners should reconsider any initial obviousness determination in view of the entire record. All the proposed rejections and their bases should be reviewed to confirm their correctness. Only then should any rejection be imposed in an Office action. The Office action should clearly communicate the Office's findings and conclusions, articulating how the conclusions are supported by the findings

Here, as discussed above, the Office's stated motivation merely recites the disclosure of Fox and is unacceptable, as demonstrated by the Office's own guidance given above:

"[d]o not recite the disclosure of the prior art which reads on the claimed invention as the motivation."

Accordingly, this rejection is improper,

In view of the above discussion, the Office's rejection is misplaced and does not establish a *prima facie* case of obviousness. Hence, for at least these reasons, this claim is allowable.

Claims 2-6 and 33 depend from claim 1 and are allowable as depending from an allowable base claim. These claims are also allowable for their own recited features which, in combination with those recited in claim 1, are neither disclosed nor taught by the references of record, either singly or in combination with one another.

Claim 7 recites a Web server input string screening method comprising:

• defining one or more search patterns that comprise literal characters and special characters, wherein the literal characters indicate exact characters in an input string that is intended for receipt by a Web server, and the special characters indicate variable characters in an input string that is intended for receipt by the Web server, the search patterns being usable to search for an attack pattern that can be used

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to attack the Web server, the attack pattern comprising content that is designed to constitute one or more of a disclosure attack, an integrity attack or a denial of service attack on the Web server; and

storing the one or more search patterns in a memory location that is accessible to a screening tool for evaluating an input string that is intended for receipt by the Web server.

In making out the rejection of this claim, the Office has not addressed all of the elements of this claim. Specifically, the only argument proffered by the Office regarding this claim is found on page 6 of the Office Action, which is reproduced below:

As per claims 7-10, 13-16, 26, 27, 29, and 30, Duvail discloses that the search patterns may be stored in RAM (see column 3, lines 45-49).

Applicant therefore traverses this rejection and respectfully reminds the Office that "it is important that the written record clearly explain the rationale for decisions made during prosecution of the application." MPEP 706.02 (j)). Applicant respectfully requests that the Office properly communicate the basis for its rejection of this claim.

Nevertheless, the references cited by the Office do not teach or suggest all of the subject matter of this claim. Additionally, as discussed above, the Office has not explained why it would have been obvious to incorporate the teachings of Duvall and Fox. Hence, for at least these reasons, the Office has not established a prima facie case of obviousness and this claim is allowable.

Claims 8-12 depend from claim 7 and are allowable as depending from an allowable base claim. These claims are also allowable for their own recited features which, in combination with those recited in claim 7, are neither disclosed

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nor taught by the references of record, either singly or in combination with one another. In addition, given the allowability of claim 7, the rejection of claim 12 over the combination with Oliver is not seen to add anything of significance.

Claim 13 recites a Web server input string screening method comprising:

- defining one or more search patterns that are specified as a regular expression, the search patterns being usable to search for an attack pattern that can be used to attack the Web server, the attack pattern comprising content that is designed to constitute one or more of a disclosure attack, an integrity attack or a denial of service attack on the Web server; and
- storing the one or more search patterns in a memory location that is accessible to a screening tool for evaluating an input string that is intended for receipt by the Web server.

In making out the rejection of this claim, the Office has not addressed all of the elements of this claim. Specifically, the only argument proffered by the Office regarding this claim is found on page 6 of the Office Action, which is reproduced above.

Nevertheless, the references cited by the Office do not teach or suggest all of the subject matter of this claim. Additionally, as discussed above, the Office has not explained why it would have been obvious to incorporate the teachings of Duvall and Fox. Hence, for at least these reasons, the Office has not established a prima facie case of obviousness and this claim is allowable.

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a pattern matching engine that is configured to receive an input string that is intended for use by a Web server and evaluate the input string to ascertain whether it likely constitutes an attack on the Web

integrity attack or a denial of service attack on the Web server; and
one or more patterns that are usable by the pattern matching engine to evaluate the input string, the patterns being defined in a manner that permits variability among the constituent parts of the one or more patterns.

server, the attack comprising one or more of a disclosure attack, an

Claims 14-17 depend from claim 13 and are allowable as depending from

Claim 18 recites a Web server input string screening tool embodied on a

an allowable base claim. These claims are also allowable for their own recited

features which, in combination with those recited in claim 13, are neither disclosed

nor taught by the references of record, either singly or in combination with one

In making out the rejection of this claim, the Office relies on the same argument that it made in regards to claim 1. Applicant respectfully disagrees with the Office and maintains that the Office has not established a *prima facie* case of obviousness. Hence, for at least these reasons, this claim is allowable.

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Claims 19-21 depend from claim 18 and are allowable as depending from an allowable base claim. These claims are also allowable for their own recited features which, in combination with those recited in claim 18, are neither disclosed nor taught by the references of record, either singly or in combination with one another.

Claim 22 recites one or more computer readable media having computerreadable instructions thereon which, when executed by a computer perform the following steps:

- receiving an input string that is intended for use by a Web server;
- evaluating the input string using a search pattern to ascertain whether the input string contains an attack pattern that can be used to attack the Web server, the attack pattern comprising content that is designed to constitute one or more of a disclosure attack, an integrity attack or a denial of service attack on the Web server, the search pattern comprising literal characters and special characters, wherein literal characters indicate exact characters in the input string, and the special characters indicate variable characters in the input string; and
- implementing a remedial action if an attack pattern is found that matches the search pattern.

In making out the rejection of this claim, the Office has not addressed all of the elements of this claim. Specifically, the only argument proffered by the Office regarding this claim is found on page 6 of the Office Action, which is reproduced below:

> As per claims 17 and 22-25, the program is stored in a public directory (on a disk) before being installed (see column 10, lines 64-68).

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Applicant therefore traverses this rejection and respectfully requests that the Office properly communicate the basis for its rejection of this claim.

Nevertheless, the references cited by the Office do not teach or suggest all of the subject matter of this claim. Additionally, as discussed above, the Office has not explained why it would have been obvious to incorporate the teachings of Duvall and Fox. Hence, for at least these reasons, the Office has not established a prima facie case of obviousness and this claim is allowable.

Claims 23-25 depend from claim 22 and are allowable as depending from an allowable base claim. These claims are also allowable for their own recited features which, in combination with those recited in claim 22, are neither disclosed nor taught by the references of record, either singly or in combination with one another.

Claim 26 recites a collection of Web server screening patterns embodied on a computer-readable medium comprising:

- a memory; and
- a plurality of patterns stored in the memory, the patterns being useable to screen input strings that are intended for use by a Web server to ascertain whether the input strings comprise attack patterns, the attack patterns comprising content that is designed to constitute one or more of a disclosure attack, an integrity attack or a denial of service attack on the Web server, individual patterns being defined in a manner that permits variability among their constituent parts.

In making out the rejection of this claim, the Office has not addressed all of the elements of this claim. Specifically, the only argument proffered by the Office regarding this claim is found on page 6 of the Office Action, which is reproduced above.

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Nevertheless, the references cited by the Office do not teach or suggest all of the subject matter of this claim. Additionally, as discussed above, the Office has not explained why it would have been obvious to incorporate the teachings of Duvall and Fox. Hence, for at least these reasons, the Office has not established a prima facie case of obviousness and this claim is allowable.

Claims 27-31 depend from claim 26 and are allowable as depending from an allowable base claim. These claims are also allowable for their own recited features which, in combination with those recited in claim 26, are neither disclosed nor taught by the references of record, either singly or in combination with one another. In addition, given the allowability of claim 26, the rejection of claim 31 over the combination with Oliver is not seen to add anything of significance.

Conclusion

Applicant respectfully submits that all of the claims are in condition for allowance and Applicant respectfully requests a Notice of Allowability be issued forthwith. If the next anticipated action is to be anything other than issuance of a Notice of Allowability, Applicant respectfully requests a telephone call for the purpose of scheduling an interview.

4/20/05

Respectfully Submitted,

By/

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